

ABSTRACT

A MISFET the channel region of which is a ferromagnetic semi-conductor has a feature that the drain current can be controlled by the gate voltage and a feature that the transfer conductance can be controlled by the relative directions of magnetization in the ferromagnetic channel region and the ferromagnetic source (or the ferromagnetic drain, or both the ferromagnetic source and ferromagnetic drain). As a result, binary information can be stored in the form of the relative magnetization directions, and the relative magnetization directions are electrically detected. If the magnetism is controlled by the electric field effect of the channel region of a ferromagnetic semiconductor, the current needed to rewrite the information can be greatly reduced. Thus, the MISFET can constitute a high-performance non-volatile memory cell suited to high-density integration.